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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/078,382	02/21/2002	Wen Dong Song	2826-11	5009

7590 03/24/2004

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EXAMINER

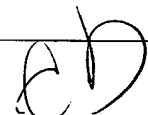
ALANKO, ANITA KAREN

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 03/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/078,382	Applicant(s) SONG ET AL.	
	Examiner Anita K Alanko	Art Unit 1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12/31/03 - amendment + 10/9/03 - IDS
2a) ☐ This action is FINAL. 2b) ☒ This action is non-final. 2/4/04 - IDS
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-16 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
~~13a)~~ ☒ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>10/9/03</u> | 6) <input type="checkbox"/> Other: _____ |

Claim Rejections - 35 USC § 112

Claim 5 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "liquid vapour" lacks proper antecedent basis. It appears that claim 5 should depend from claim 2.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Inoue (JP 59-178189).

Inoue discloses a method including forming a liquid film ("fluid film" page 10 of translation, lines 8-9) on the substrate surface 24 and directing laser energy from a laser 1 through the film to etch the substrate surface, wherein etched material is carried away from the substrate surface via evaporation of the film during said etching (page 10, lines 5-8).

As to claim 16, Inoue does not disclose what the substrate is, but it must inherently comprise an insulator, conductor or semiconductor.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-10, 12-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Gupta et al (US 5,057,184) in view of Douglas (US 6,177,358).

Gupta discloses a method including

forming a liquid 12 on a substrate surface 28 and

directing laser energy 22 from a laser through the film to etch the substrate surface,

wherein etched material is carried away from the substrate surface via evaporation of the film during said etching (see abstract).

Gupta does not disclose that the liquid is in the form of a liquid film. Rather, Gupta discloses immersing the substrate in a bath of liquid.

Douglas teaches that a useful alternative for immersing in a bath of liquid (Fig.2) is to form a liquid film 26 (Fig.3) during the photo-induced patterning of a substrate. It would have been obvious to one with ordinary skill in the art to use a liquid film in the method of Gupta because Douglas teaches that it is a useful alternative for forming liquids during photo-induced patterning of a substrate.

As to claim 2, Douglas teaches to introduce a water vapor 24, for which it would be obvious to jet because it is a conventional means of introducing water vapor to chambers.

As to claim 3, Gupta discloses to use water or alcohol or inert liquid (col.4, lines 17-23).

As to claim 4, it is unclear how thick the liquid film is in the method of Douglas, however it would have been obvious to one with ordinary skill in the art to use the cited thickness in the modified method of Gupta because the thickness appears to reflect a result-effective variable which can be optimized. See MPEP 2144.05 IIB.

As to claims 5-6, examiner takes official notice that using a gas such as nitrogen, compressed air, oxygen or inert gas to carry liquid vapor is a conventional technique. It would have been obvious to one with ordinary skill in the art to use a gas such as nitrogen, compressed air, oxygen or inert gas to carry liquid vapor in the modified method of Gupta because it is a conventional technique.

As to claims 7-8, Gupta discloses to use pulses of 20-30 nanoseconds (co.5, line 12), which is within the range cited.

As to claims 9-10, since the same method is carried out in Gupta, it is expected to encompass the same laser fluence as that cited in claim 9. Gupta discloses that the laser fluence determines the depth of the etch (col.4, lines 39-41). It would have been obvious to one with ordinary skill in the art to use the cited fluence in the modified method of Gupta because the fluence appears to reflect a result-effective variable which can be optimized. See MPEP 2144.05 IIB.

As to claims 12-16, Gupta discloses that the substrate may comprise one or more layers (silicon oxide on silicon, col.4, line 16).

Claims 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gupta et al (US 5,057,184) in view of Douglas (US 6,177,358) and admitted prior art.

The discussion of modified Gupta from above is repeated here.

As to claim 11, Gupta does not disclose that the substrate may comprise ITO. Gupta discloses that metal oxides may be used (col.4, lines 14-17). Admitted prior art teaches that it is known to laser pattern ITO (page 2, lines 6-20). It would have been obvious to one with ordinary skill in the art to pattern ITO in the modified method of Gupta because admitted prior art teaches that ITO can be laser patterned.

Claims 1, 7-10 and 12-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue (JP 59-178189) in view of Gupta et al (US 5,057,184).

The discussion of Inoue (JP 59-178189) from above is repeated here.

As to claims 7-8, Inoue does not disclose to pulse the laser. The discussion of Gupta from above is repeated here. Gupta teaches to use pulses of 20-30 nanoseconds (co.5, line 12), which is within the range cited. It would have been obvious to one with ordinary skill in the art to pulse as taught by Gupta in the method of Inoue because Gupta teaches that this is a useful technique for laser patterning.

As to claims 9-10, Inoue does not explicitly disclose the fluence. Gupta teaches that the laser fluence determines the depth of the etch (col.4, lines 39-41). It would have been obvious to one with ordinary skill in the art to use the cited fluence in the method of Inoue because the fluence appears to reflect a result-effective variable which can be optimized. See MPEP 2144.05 IIB.

As to claims 12-16, Inoue does not disclose the composition of the substrate. Gupta teaches that a useful substrate to pattern by lasers may comprise one or more layers (silicon

oxide on silicon, col.4, line 16). It would have been obvious to one with ordinary skill in the art to pattern the layers as cited in claims 12-16 in the method of Inoue because Gupta teaches that to so by lasers is known and useful.

Claims 1, 11 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue (JP 59-178189) in view of admitted prior art.

The discussion of Inoue from above is repeated here.

As to claim 11, Inoue does not disclose the composition of the substrate. Admitted prior art teaches that it is known to laser pattern ITO (page 2, lines 6-20). It would have been obvious to one with ordinary skill in the art to pattern ITO in the method of Inoue because admitted prior art teaches that ITO can be laser patterned.

Response to Amendment

The 112 rejection is withdrawn. Claim 5 is newly rejected under 112, 2nd paragraph. The claims remain rejected over the combination of Gupta and Douglas, and the combination of Gupta, Douglas and admitted prior art. The claims are also newly rejected over newly cited Inoue et al.

Response to Arguments

Applicant's arguments filed 12/31/04 have been fully considered but they are not persuasive.

Applicant argues that Douglas does not teach evaporation of the film during the etching, but rather by active evacuation of the chamber or rinsing with water. Examiner acknowledges the chamber evacuation, but this is not equivalent to teaching that there is no evaporation of the film during the etching. There is some degree of evaporation of the film during the etching. The active evacuation step removes what remains in the chamber atmosphere from the evaporation during etching. The same method steps are carried out in the modified method of Gupta as in the instant invention, therefore the same results are expected of evaporation during etching.

Applicant's arguments about etching of the substrate is not commensurate in scope with the claim language. Claims 11-14 cite that the substrate comprises layers. Layers on a substrate are considered part of the substrate.

Applicant argues that Douglas' teachings do not prove any "usefulness" of a liquid film over a liquid bath. Examiner disagrees. The mere mention in the patent of the liquid film embodiment is indicative of its usefulness.

Examiner acknowledges the problems confronted by the inventor and the claimed advantages. However, when considering the prior art as a whole in light of these considerations, the claimed invention is deemed not novel or obvious as discussed above in the rejection.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The cited art shows methods of laser induced wet etching.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anita K Alanko whose telephone number is 571-272-1458. The examiner can normally be reached on Mon, Tues & Fri: 8:30 am-5 pm; Wed & Thurs: 10 am-2 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Anita K. Alanko

Anita K Alanko
Primary Examiner
Art Unit 1765